

Appendix D



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

January 16, 1997

MEMORANDUM

SUBJECT: The Use of "Third-Parties" in the Drinking Water Laboratory Certification Program

FROM: Cynthia Dougherty, Director
Office of Ground Water and Drinking Water

TO: Water Supply Representatives, Regions I-X
Certification Authorities, Regions I-X
Quality Assurance Officers, Regions I-X
Regional Laboratories, Regions I-X

Purpose

This memorandum updates and clarifies the guidance memorandum from Michael Cook dated December 5, 1989 on "Third-Party Certification for Laboratories in Primacy States."

Action

Under 40 CFR 142.10(b) (3), if a State does not perform all analytical measurements in its own laboratory, it must establish and maintain a program for the certification of laboratories as a condition for receiving and maintaining authority to administer the Safe Drinking Water Act in lieu of EPA (primacy). This memorandum notifies States with primacy that they may contract with other organizations (third parties) to assist the State in fulfilling this requirement. The authority for making certification decisions however, must remain with the State.

Discussion

Several States have asked USEPA its position on the use of third-parties, i.e., private sector organizations which assist the States with their certification program. OGWDW realizes that dwindling State resources may necessitate assistance from third-parties in the State certification programs. Consistent with the regulatory requirement at 40 CFR 142.10(b), providing for the "establishment and maintenance of a State program for the certification of laboratories," the State must retain ultimate authority to decide whether individual laboratories will be certified: this decision may not be abdicated to the third party.

This Office will not pass judgment on any specific third-party program. It is the responsibility of each primacy State to assess the qualifications of the third-party. In assessing whether to choose a particular third-party, the State should consider, as a minimum, the following items which are described in the

Manual for the Certification of Laboratories Analyzing Drinking Water:

- o Ability to provide technical assistance and training
- o Availability of records for review by the State
- o Quality assurance program
- o Freedom from conflicts of interest
- o EPA policy, which provides that the auditor should pass an appropriate course on how to audit in the discipline for which he or she will be auditing.
- o Experience of the auditor.
The auditor should be an experienced professional with at least a bachelor's degree or equivalent education/experience in the discipline for which he or she audits.

The auditor should have recent laboratory experience

Any State certification program using third party assistance should meet the requirements in the *Manual for the Certification of Laboratories Analyzing Drinking Water* just as it would if it were using State employees to perform these functions. The Regions should assist the State and third-party agent to assure that the certification program meets EPA guidelines.

Regions and States should be sensitive to potential conflict-of-interest problems between a third-parties and evaluated laboratories. For instance, inspectors employed by firms that provide analytical services in the drinking water area should not be put in the position of passing judgement on their competitors.

Further Information

If you have questions or need additional information or assistance, please contact the OGWDW Technical Support Center at 513-569-7904.

Appendix E
Required Analytical Capability for Principal State Laboratory Systems

INORGANICS
(40 CFR 141.23)

Asbestos
Cyanide
Fluoride
Nitrate
Nitrite
Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Mercury
Selenium
Thallium
(40 CFR 141.89)
Copper
Lead
Conductivity
Calcium
Alkalinity
Orthophosphate
Silica

VOLATILE ORGANICS
(40 CFR 141.24)

THMs
Benzene
Carbon tetrachloride
Chlorobenzene
o-Dichlorobenzene
p-Dichlorobenzene
1,2-Dichloroethane
1,1-Dichloroethylene
cis-1,2-Dichloroethylene
trans-1,2-Dichloroethylene
Dichloromethane
1,2-Dichloropropane
Ethylbenzene
Styrene
Tetrachloroethene
Toluene
1,2,4-Trichlorobenzene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethene
Vinyl chloride
Xylenes

DBPs

HAA₅
Bromate
Chlorite

SOCs

(40 CFR 141.24)
Alachlor
Atrazine
Benzo(a)pyrene
Carbofuran
Chlordane
2,4-D
Di(2-ethylhexyl)adipate
Di(2-ethylhexyl)phthalate
Dibromochloropropane
Dalapon
Dinoseb
Dioxin (2,3,7,8-TCDD)
Diquat
Endothall
Endrin
Ethylenedibromide
Glyphosate
Heptachlor
Heptachlor epoxide
Hexachlorobenzene
Hexachlorocyclopentadiene
Lindane
Methoxychlor
Oxamyl
PCBs (as decachlorobiphenyl)
Pentachlorophenol
Picloram
Simazine
Toxaphene
2,4,5-TP

RADIONUCLIDES

(40 CFR 141.25)
Gross Alpha
Uranium
Gross Beta
Cesium-134
Strontium-89
Iodine-131
Strontium-90
Tritium
Other beta/photon emitters
Radium-226/228

MICROORGANISMS

(40 CFR 141.21)
Total coliforms
Escherichia coli or fecal
coliforms
Heterotrophic bacteria

Appendix F



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460
Office of Ground Water and Drinking Water
Technical Support Center

OCT 1 2002

OFFICE OF
WATER

MEMORANDUM

SUBJECT: Update on the Use of National Environmental Laboratory Accreditation Conference (NELAC) Standards for Certification of Laboratories Analyzing Drinking Water Samples

FROM: Cynthia C. Dougherty, Director
Office of Ground Water and Drinking Water

TO: Regional Drinking Water Representatives (Regions I-X)
Regional Laboratory Certification Officers (Regions I-X)

It has been almost five years since my memorandum of October 20, 1997 supporting the use of NELAC standards and I would like to report to you on recent developments.

Following NELAC program implementation, the Office of Ground Water and Drinking Water's (OGWDW's) Laboratory Certification Team conducted a review of 16 laboratory audits performed by eight of the NELAC Accrediting Authorities. The findings of this review were presented to the Accrediting Authorities during the "NELAC 8" meeting in Tampa, Florida on July 11, 2002. Significantly, the review verified equivalency to the criteria in OGWDW's "Manual for the Certification of Laboratories Analyzing Drinking Water," EPA 815-B-97-001, March 1997.

The NELAC standards, as amended through July 2002, may therefore be used as alternative guidance for use by States in the certification of laboratories under the Safe Drinking Water Act (SDWA). I continue to support the use of the NELAC standards in the certification of laboratories analyzing drinking water samples. Further, the use of NELAC standards fosters and increases the opportunity for national consistency. One of the Agency's primary goals in participating in NELAC is to encourage States to recognize certification of laboratories by other States, referred to as "reciprocity."

I would like to emphasize that NELAC is a voluntary program and that States may choose to continue to certify under the existing program based upon the criteria in OGWDW's aforementioned certification manual. Both options are acceptable in terms of maintaining primacy and producing data for compliance purposes.

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I congratulate NEELAC on their successful implementation of the standards and strongly encourage future reviews of the laboratory audits. Reviews conducted on a periodic basis, random in nature, and weighted toward larger programs, will allow continued assessment of equivalency and promote greater consistency within the program. I reiterate that the drinking water program will benefit nationwide through State participation in the accreditation program. If you have questions concerning the drinking water laboratory certification program or its relationship to NEELAC, please contact Caroline Madding at 513-569-7402.

cc: Nanci Gelb (4601M)
Ephraim King (4607M)
Gregory Carroll (CI-TSC-140)
Ed Glick (CI-TSC-140)
Patricia Hurr (CI-TSC-140)
Caroline Madding (CI-TSC-140)

Appendix G

Analytical Methods for Microbiology

Note: Information in brackets is not yet included in the Code of Federal Regulations

1. Total Coliform Rule (40 CFR 141.21(f))

(f) Analytical methodology.

(1) The standard sample volume required for total coliform analysis, regardless of analytical method used, is 100 mL.

(2) Public water systems need only determine the presence or absence of total coliforms; a determination of total coliform density is not required.

(3) Public water systems must conduct total coliform analyses in accordance with one of the analytical methods in the following table.

Organisms	Methodology ¹²	Citation ¹
Total Coliforms ²	Total Coliform Fermentation Technique ^{3,4,5}	9221 A, B
	Total Coliform Membrane Filter Technique ⁶	9222 A, B, C
	Presence-Absence (P-A) Coliform Test ^{5,7}	9221 D
	ONPG-MUG Test ⁸	9223
	Colisure Test ⁹	
	E*Colite [®] Test ¹⁰	
	m-ColiBlue24 [®] Test ¹¹	
	ReadiCult [®] Coliforms 100 ¹³	
	Membrane Filter Technique using Chromocult [®] Coliform Agar ¹⁴	
	Colitag Test ¹⁵	

The procedures shall be done in accordance with the documents listed below. The incorporation by reference of the following documents listed in footnotes 1, 6, 8, 9, 10, 11, 13 and 14 was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51. Copies of the documents may be obtained from the sources listed below. Information regarding obtaining these documents can be obtained from the Safe Drinking Water Hotline at 800-426-4791. Documents may be inspected at EPA's Drinking Water Docket, 1301 Constitution Avenue, NW., EPA West, Room B102, Washington, DC 20460 (Telephone 202-566-2426) or at the Office of Federal Register, 800 North Capitol Street, NW, Suite 700, Washington, DC 20408.

¹ *Standard Methods for the Examination of Water and Wastewater*, 18th edition (1992), 19th edition (1995), or 20th edition (1998). American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005. The cited methods published in any of these three editions may be used.

² The time from sample collection to initiation of analysis may not exceed 30 hours. Systems are encouraged but not required to hold samples below 10 deg. C during transit.

³ Lactose broth, as commercially available, may be used in lieu of lauryl tryptose broth, if the system conducts at least 25 parallel tests between this medium and lauryl tryptose broth using the water normally tested, and this comparison demonstrates that the false-positive rate and false-negative rate for total coliform[s], using lactose broth, is less than 10 percent.

⁴ If inverted tubes are used to detect gas production, the media should cover these tubes at least one-half to two-thirds after the sample is added.

⁵ No requirement exists to run the completed phase on 10 percent of all total coliform-positive confirmed tubes.

⁶ MI agar also may be used. Preparation and use of MI agar is set forth in the article, "New medium for the simultaneous detection of total coliform[s] and *Escherichia coli* in water" by Brenner, K.P., et al., 1993, Appl. Environ. Microbiol. 59:3534-3544. Also available from the Office of Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue, NW, Washington, DC 20460, EPA/600/J-99/225. Verification of colonies is not required.

⁷ Six-times formulation strength may be used if the medium is filter-sterilized rather than autoclaved.

⁸ The ONPG-MUG Test is also known as the Autoanalysis Colilert System.

⁹ A description of the Colisure Test, Feb 28, 1994, may be obtained from IDEXX Laboratories, Inc., One IDEXX Drive, Westbrook, Maine 04092. The Colisure Test may be read after an incubation time of 24 hours.

¹⁰ A description of the E*Colite® Test, "Presence/Absence for Coliforms and *E. coli* in Water," Dec 21, 1997, is available from Charm Sciences, Inc., 36 Franklin Street, Malden, MA 02148-4120.

¹¹ A description of the m-ColiBlue24® Test, Aug 17, 1999, is available from the Hach Company, 100 Dayton Avenue, Ames, IA 50010.

¹² EPA strongly recommends that laboratories evaluate the false-positive and negative rates for the method(s) they use for monitoring total coliforms. EPA also encourages laboratories to establish false-positive and false-negative rates within their own laboratory and sample matrix (drinking water or source water) with the intent that if the method they choose has an unacceptable false-positive or negative rate, another method can be used. The Agency suggests that laboratories perform these studies on a minimum of 5% of all total coliform-positive samples, except for those methods where verification/confirmation is already required, e.g., the M-Endo and LES Endo Membrane Filter Tests, Standard Total Coliform Fermentation Technique, and Presence-Absence Coliform Test. Methods for establishing false-positive and negative-rates may be based on lactose fermentation, the rapid test for β -galactosidase and cytochrome oxidase, multi-test identification systems, or equivalent confirmation tests. False-positive and false-negative information is often available in published studies and/or from the manufacturer(s).

¹³ The Readycult® Coliforms 100 Presence/Absence Test is described in the document, "Readycult® Coliforms 100 Presence/Absence Test for Detection and Identification of Coliform Bacteria and *Escherichia coli* in Finished Waters," (November 2000, Version 1.0) and is available from EM Science [now EMD Chemicals, Inc.], an affiliate of Merck KGaA, Darmstadt Germany), 480 S. Democrat Road, Gibbstown, NJ 08027-1297. Telephone number is (800) 222-0342, E-Mail address is: adellenbusch@emscience.com. [E-Mail address is now adellenbusch@emdchemicals.com. Website is www.emdchemicals.com]

¹⁴ Membrane Filter Technique using Chromocult® Coliform Agar is described in the document, "Chromocult® Coliform Agar Presence/Absence Membrane Filter Test Method for Identification of Coliform Bacteria and *Escherichia coli* in Finished Waters," November 2000, Version 1.0, available from EM Science [now EMD Chemicals, Inc.] (an affiliate of Merck KGaA, Darmstadt Germany), 480 S. Democrat Road, Gibbstown, NJ 08027-1297. Telephone number is (800) 222-0342, E-Mail address is: adellenbusch@emscience.com. [E-Mail address is now adellenbusch@emdchemicals.com. Website is www.emdchemicals.com]

¹⁵ Colitag® product for the determination of the presence/absence of total coliforms and *E. coli* is described in "Colitag® Product as a Test for Detection and Identification of Coliforms and *E. coli* Bacteria in Drinking Water and Source Water as Required in National Primary Drinking Water Regulations," August 2001, available from CPI International, Inc., 5580 Skylane Blvd., Santa Rosa, CA, 95403, telephone (800) 878-7654, Fax (707) 545-7901, Internet address <http://www.cpiinternational.com>.

(4) [Reserved]

(5) Public water systems must conduct fecal coliform analysis in accordance with the following procedure. When the MTF Technique or Presence-Absence (PA) Coliform Test is used to test for total coliforms, shake the lactose-positive presumptive tube or P-A vigorously and transfer the growth with a sterile 3-mm loop or sterile applicator stick into brilliant green lactose bile broth and EC medium to determine the presence of total and fecal coliforms, respectively. For EPA-approved analytical methods which use a membrane filter, transfer the total coliform-positive culture by one of the following methods: remove the membrane containing the total coliform colonies from the substrate with a sterile forceps and carefully curl and insert the membrane into a tube of EC medium (the laboratory may first remove a small portion of selected colonies for verification), swab the entire membrane filter surface with a sterile cotton swab and transfer the inoculum to EC medium (do not leave the cotton swab in the EC medium), or inoculate individual total coliform-positive colonies into EC Medium. Gently shake the inoculated tubes of EC medium to insure adequate mixing and incubate in a waterbath at $44.5 \pm 0.2^\circ \text{C}$ for 24 ± 2 hours. Gas production of any amount in the inner fermentation tube of the EC medium indicates a positive fecal coliform test. The preparation of EC medium is described in Method 9221 E (paragraph 1a) in *Standard Methods for the Examination of Water and Wastewater*, 18th edition (1992), 19th edition (1995), and 20th edition (1998); the cited method in any one of these three editions may be used. Public water systems need only determine the presence or absence of fecal coliforms; a determination of fecal coliform density is not required.

(6) Public water systems must conduct analysis of *Escherichia coli* in accordance with one of the following analytical

methods:

(i) EC medium supplemented with 50 µg/mL of 4-methylumbelliferyl-beta-D-glucuronide (MUG) (final concentration), as described in Method 9222G in Standard Methods for the Examination of Water and Wastewater, 19th edition (1995) and 20th edition (1998). Either edition may be used. Alternatively, the 18th edition (1992) may be used if at least 10 mL of EC medium, as described in paragraph (f)(5) of this section, is supplemented with 50 µg/mL of MUG before autoclaving. The inner inverted fermentation tube may be omitted. If the 18th edition is used, apply the procedure in paragraph (f)(5) of this section for transferring a total coliform-positive culture to EC medium supplemented with MUG, incubate the tube at $44.5 \pm 0.2^\circ\text{C}$ for 24 ± 2 hours, and then observe fluorescence with an ultraviolet light (366 nm) in the dark. If fluorescence is visible, *E. coli* are present.

(ii) Nutrient agar supplemented with 100 µg/mL 4-methylumbelliferyl-beta-D-glucuronide (MUG) (final concentration), as described in Method 9222G in Standard Methods for the Examination of Water and Wastewater, 19th edition (1995) and 20th edition (1998). Either edition may be used for determining if a total coliform-positive sample, as determined by a membrane filter technique, contains *E. coli*. Alternatively, the 18th edition (1992) may be used if the membrane filter containing a total coliform-positive colony(ies) is transferred to nutrient agar, as described in Method 9221B (paragraph 3) of Standard Methods (18th edition), supplemented with 100 µg/mL of MUG. If the 18th edition is used, incubate the agar plate at 35°C for 4 hours and then observe the colony(ies) under ultraviolet light (366 nm) in the dark for fluorescence. If fluorescence is visible, *E. coli* are present.

(iii) Minimal Medium ONPG-MUG (MMO-MUG) Test, as set forth in the article "National Field Evaluation of a Defined Substrate Method for the Simultaneous Detection of Total Coliforms and *Escherichia coli* from Drinking Water: Comparison with Presence-Absence Techniques" (Edberg et al.), Applied and Environmental Microbiology, Volume 55, pp. 1003-1008, April 1989. (Note: The Autoanalysis Colilert System is an MMO-MUG test).

If the MMO-MUG test is total coliform-positive after a 24-hour incubation, test the medium for fluorescence with a 366-nm ultraviolet light (preferably with a 6-watt lamp) in the dark. If fluorescence is observed, the sample is *E. coli*-positive. If fluorescence is questionable (cannot be definitively read) after 24 hours incubation, incubate the culture for an additional four hours (but not to exceed 28 hours total), and again test the medium for fluorescence. The MMO-MUG

Test with hepes buffer in lieu of phosphate buffer is the only approved formulation for the detection of *E. coli*.

(iv) The Colisure Test. A description of the Colisure Test may be obtained from the Millipore Corporation, Technical Services Department, 80 Ashby Road, Bedford, MA 01730. [Note: Manufacturer is now IDEXX Laboratories. See footnote 9 to the table in paragraph (f)(3) of this section.]

(v) The membrane filter method with MI agar, a description of which is cited in footnote 6 to the table in paragraph (f)(3) of this section.

(vi) E*Colite® Test, a description of which is cited in footnote 10 to the table at paragraph (f)(3) of this section.

(vii) m-ColiBlue24® Test, a description of which is cited in footnote 11 to the table in paragraph (f)(3) of this section.

(viii) ReadyCult® Coliforms 100 Presence/Absence Test, a description of which is cited in footnote 13 to the table at paragraph (f)(3) of this section.

(ix) Membrane Filter Technique using Chromocult® Coliform Agar, a description of which is cited in footnote 14 to the table at paragraph (f)(3) of this section.

(7) As an option to paragraph (f)(6)(iii) of this section, a system with a total coliform-positive, MUG-negative, MMO-MUG test may further analyze the culture for the presence of *E. coli* by transferring a 0.1 mL, 28-hour MMO-MUG culture to EC Medium + MUG with a pipet. The formulation and incubation conditions of EC Medium + MUG, and observation of the results are described in paragraph (f)(6)(i) of this section.

(8) The following materials are incorporated by reference in this section with the approval of the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of the analytical methods cited in *Standard Methods for the Examination of Water and Wastewater* (18th, 19th, and 20th editions) may be obtained from the American Public Health Association et al.; 1015 Fifteenth Street NW., Washington, DC 200052605. Copies of the MMO-MUG Test as set forth in the article "National Field Evaluation of a Defined Substrate Method for the Simultaneous Enumeration of Total Coliforms and *Escherichia coli* from Drinking Water: Comparison with the Standard Multiple Tube Fermentation Method" (Edberg et al.) may be obtained from the American Water Works Association Research Foundation, 6666 West Quincy Avenue, Denver, CO 80235. A description of the Colisure Test may be obtained from the Millipore Corp., Technical Services Department, 80 Ashby Road, Bedford, MA 01730 [Note: Now a description of the Colisure Test may now be obtained from IDEXX Laboratories, Inc., One IDEXX Drive, Westbrook, Maine 04092.]. Copies may be inspected at EPA's Drinking Water Docket; 401 M St., SW.; Washington, DC 20460 [Note: current location of EPA's Drinking Water Docket is 1301 Constitution Avenue, NW., EPA West, Room B102, Washington, DC 20460], or at the Office of the Federal Register; 800 North Capitol Street, NW., Suite 700, Washington, DC.

2. Surface Water Treatment Rule (40 CFR 141.74(a))

(a) *Analytical requirements.* Only the analytical method(s) specified in this paragraph, or otherwise approved by EPA, may be used to demonstrate compliance with §§141.71, 141.72 and 141.73. Measurements for pH, turbidity, temperature and residual disinfectant

concentrations must be conducted by a person approved by the State. Measurement for total coliforms, fecal coliforms and HPC must be conducted by a laboratory certified by the State or EPA to do such analysis. Until laboratory certification criteria are developed for the

analysis of fecal coliforms and HPC, any laboratory certified for total coliforms analysis by the State or EPA is deemed certified for fecal coliforms and HPC analysis. The following procedures shall be conducted in accordance with the publications listed in the following section.

This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of the methods published in *Standard Methods for the Examination of Water and Wastewater* may be obtained from the American Public Health Association et al., 1015 Fifteenth Street, NW., Washington, DC 20005; copies of the Minimal Medium ONPG-MUG Method as set forth in the article "National Field Evaluation of a Defined Substrate Method for the Simultaneous Enumeration of Total Coliforms and *Escherichia coli* from Drinking Water: Comparison with the Standard Multiple Tube Fermentation Method" (Edberg et al.), *Applied and Environmental Microbiology*, Volume

54, pp. 1595-1601, June 1988 (as amended under Erratum, *Applied and Environmental Microbiology*, Volume 54, p. 3197, December, 1988), may be obtained from the American Water Works Association Research Foundation, 6666 West Quincy Avenue, Denver, Colorado, 80235; and copies of the Indigo Method as set forth in the article "Determination of Ozone in Water by the Indigo Method" (Bader and Hoigne), may be obtained from Ozone Science & Engineering, Pergamon Press Ltd., Fairview Park, Elmsford, New York 10523. Copies may be inspected at the U.S. Environmental Protection Agency, Room EB15, 401 M St., SW., Washington, DC 20460 [Note: current location of EPA's Drinking Water Docket is 1301 Constitution Avenue, NW., EPA West, Room B102, Washington, DC 20460;] or at the Office of the Federal Register, 800 North Capitol Street, NW., suite 700, Washington, DC.

(1) Public water systems must conduct analysis of pH and temperature in accordance with one of the methods listed at §141.23(k)(1). Public water systems must conduct analysis of total coliforms, fecal coliforms, heterotrophic bacteria, and turbidity in accordance with one of the following analytical methods and by using analytical test procedures contained in *Technical Notes on Drinking Water Methods*, EPA-600/R-94-173, October 1994, which is available at NTIS PB95-104766.

Organism	Methodology	Citation ¹
Total Coliform ²	Total Coliform Fermentation Technique ^{3,4,5} Total Coliform Membrane Filter Technique ⁶ ONPG-MUG Test ⁷	9221 A, B, C 9222 A, B, C 9223
Fecal Coliforms ²	Fecal Coliform Procedure ⁸ Fecal Coliform Filter Procedure	9221 E 9222 D
Heterotrophic bacteria ² ..	Pour Plate Method SimPlate ¹¹	9215 B
Turbidity	Nephelometric Method Nephelometric Method Great Lakes Instruments Hach FilterTrak	2130 B 180.1 ⁹ Method 2 ¹⁰ 10133 ¹²

The procedures shall be done in accordance with the documents listed below. The incorporation by reference of the following documents listed in footnotes 1, 6, 7, 9-12 was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of the documents may be obtained from the sources listed below. Information regarding obtaining these documents can be obtained from the Safe Drinking Water Hotline at 800-426-4791. Documents may be inspected at EPA's Drinking Water Docket, 1301 Constitution Avenue, NW., EPA West, Room B102, Washington, DC 20460 (Telephone: 202-566-2426); or at the Office of the Federal Register, 800 North Capitol Street, NW, Suite 700, Washington, D.C. 20408.

¹ Except where noted, all methods refer to *Standard Methods for the Examination of Water and Wastewater*, 18th edition (1992), 19th edition (1995), or 20th edition (1998), American Public Health Association, 1015 Fifteenth Street, NW, Washington, D.C. 20005. The cited methods published in any of these three editions may be used.

² The time from sample collection to initiation of analysis may not exceed 8 hours. Systems must hold samples below 10 deg. C during transit.

³ Lactose broth, as commercially available, may be used in lieu of lauryl tryptose broth, if the system conducts at least 25 parallel tests between this medium and lauryl tryptose broth using the water normally tested, and this comparison demonstrates that the false- positive rate and false-negative rate for total coliform, using lactose broth, is less than 10 percent.

⁴ Media should cover inverted tubes at least one-half to two-thirds after the sample is added.

⁵ No requirement exists to run the completed phase on 10 percent of all total coliform-positive confirmed tubes.

⁶ MI agar also may be used. Preparation and use of MI agar is set forth in the article, "New medium for the simultaneous detection of total coliform[s] and *Escherichia coli* in water" by Brenner, K.P., et al., 1993, *Appl. Environ. Microbiol.* 59:3534-3544. Also available from the Office of Water Resource Center (RC-4100T), 1200 Pennsylvania Ave., NW., Washington, DC 20460, EPA 600/J-99/225. Verification of colonies is not required.

⁷ The ONPG-MUG Test is also known as the Autoanalysis Colilert System.

⁸ A-1 Broth may be held up to three months in a tightly closed screw cap tube at 4 deg. C.

⁹ "Methods for the Determination of Inorganic Substances in Environmental Samples", EPA/600/R-93/100, August 1993. Available at NTIS, PB94-121811.

¹⁰ GLI Method 2, "Turbidity", November 2, 1992, Great Lakes Instruments, Inc., 8855 North 55th Street, Milwaukee, Wisconsin 53223.

¹¹ A description of the SimPlate method, "IDEXX SimPlate TM HPC Test Method for Heterotrophs in Water", November 2000, can be obtained from IDEXX Laboratories, Inc., One IDEXX Drive, Westbrook, Maine 04092, telephone (800) 321-0207.

¹² A description of the Hach FilterTrak Method 10133, "Determination of Turbidity by Laser Nephelometry", January 2000, Revision 2.0, can be obtained from Hach Co., P.O. Box 389, Loveland, Colorado 80539-0389. Phone: 800-227-4224.

3. Ground Water Rule (to be added after rule promulgation)